

REMARKS

Claims 23, 35, 39, and 46-47 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite. The Office's position is that claims 23, 35, 39 and 46-47 do not further limit the claims on which they depend. Claims 23, 27, 31, 35, 39, 46 and 47 have been canceled.

Removal of the 35 U.S.C. 112, second paragraph, rejection is believed to be in order and is respectfully requested.

Claims 20 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fusegawa et al. (US 2003/0106484) (hereinafter: "Fusegawa") in view of Wakabayashi et al. (US 2006/0130737) (hereinafter: "Wakabayashi"). Claims 21 to 23 and 25 to 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fusegawa and Wakabayashi and further in view of various combinations of Haas et al. (U.S. Patent No. 4,119,441) (hereinafter: "Haas"), Kobayashi (US 2006/0024915) (hereinafter: "Kobayashi"), Asayama et al. (U.S. Patent No. 6,641,888) (hereinafter: "Asayama") and Sakurada et al. (US 2005/006432) (hereinafter: "Sakurada").

The 35 U.S.C. 103(a) rejections as applied to claims 23, 27, 31, 35, 39, 46 and 47 are moot in view of the cancellation of the claims.

The 35 U.S.C. 103(a) rejections as applied to the remaining claims are improper. Each of the 35 U.S.C. § 103(a) rejections rely on Wakabayashi. However, Wakabayashi is not a proper reference against the claims of the present application. Wakabayashi is not entitled to the July 7, 2003, filing date of PCT/JP03/08577 (under 35 U.S.C. § 102(e)) because PCT/JP03/08577 was not published in English. The earliest date to which Wakabayashi is entitled is the June 22, 2006, publication date of US 2006/0130737, which is later than the international filing date, December 19, 2003, of the present application. The international publication of Wakabayashi, WO 2004/018742 A1, was published on March 4, 2004, and is also not an effective reference against the present application.

For this reason alone the 35 U.S.C. 103(a) rejections of the claims are improper and should be removed.

Applicants note that Kobayashi and Sakurada are also not proper references against the claims of the present application because their effective dates as references are subsequent to the international filing date of the present application for the same reason as explained above with respect to Wakabayashi. Kobayashi is the U.S. National Stage of PCT/JP03/14442. PCT/JP03/14442 was published in Japanese on June 17, 2004, as international

publication WO 2004/051715 A1. Sakurada is the U.S. National Stage of PCT/JP03/13645. PCT/JP03/13645 was published in Japanese on May 13, 2004, as international publication WO 2004/040650 A1.

Notwithstanding the impropriety of the rejections, applicants would like to note the following. Fusegawa shows the Czochralski (crystal pulling) method and discloses a method for making the interstitial oxygen concentration in the single silicon crystal low by controlling the pulling conditions (pulling speed, strength of magnetic field, for single crystal silicon, rotary speed of crucible, etc.) and manufacturing high quality wafers. Furthermore, Fusegawa discloses heat treatment of this wafer for 100 minutes at 1150°C in a wet oxidizing atmosphere to examine the distribution of OSF occurrence in a wafer grown and manufactured under the conditions prescribed above. In addition, it is disclosed that from the standpoint of warp and slippage, the preferable oxygen concentration for the wafer described above is $6 - 10 \times 10^{17}$ atom/cm³.

However, Fusegawa contains no description of the relationship between the interstitial oxygen concentration of the wafer and the heat treatment temperature for the wafer. In addition, no SOI wafer manufacturing method is disclosed.

Haas discloses a technique for p doping by neutron irradiation in a single silicon crystal manufacturing method. There is no disclosure of the relationship between the wafer oxygen concentration and the wafer heat treatment temperature.

Asayama discloses nitrogen doping in a prescribed concentration and carbon doping in a prescribed concentration for single crystal silicon for silicon wafers and epitaxial wafers. There is absolutely no disclosure of the relationship between the oxygen concentration and the heat treatment temperature for these silicon wafers.

On the other hand, the invention according to the claims of the present application establishes a relationship between the oxygen concentration of the silicon wafer and the heat treatment temperature for the silicon wafer in the manufacturing of silicon wafer based on the equation noted above. As noted above, there is no disclosure nor any suggestion of these relationships in Fusegawa, Haas or Asayama.

In particular, the reason for establishing a prescribed value for the interstitial oxygen concentration in the single crystal silicon in Fusegawa is to prevent the occurrence of warpage when the wafer is heat treated subsequently and, in addition, to prevent the occurrence of slippage dislocations due to heat distortion. In

other words, there is no disclosure of the relationship between the heat treatment in the silicon wafer manufacturing method and the oxygen concentration of the wafer in Fusegawa.

Therefore, even if the invention of Haas or the invention of Asayama could be combined with the invention of Fusegawa, it would not result in the invention as defined in the various claims of the present application.

Removal of the 35 U.S.C. 103(a) rejections of the claims is believed to be in order and is respectfully requested.

The foregoing is believed to be a complete and proper response to the Office Action dated November 29, 2006.

In the event that this paper is not considered to be timely filed, applicants hereby petition for an appropriate extension of time. The fee for any such extension and any additional fees may be charged to our Deposit Account No. 111833.

Respectfully submitted,
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